

IN THE CLAIMS

1. (Currently amended) A method for determining a field strength of radio-frequency energy emitted during a magnetic resonance measurement, comprising the steps of:

from an antenna of a magnetic resonance examination apparatus, ~~generating a radio-frequency field having a field strength associated therewith by~~ emitting at least one radio-frequency pulse from said antenna to generate an antenna-emitted radio-frequency field having a field strength, and thereby causing an examination subject in said radio-frequency field to emit a magnetic resonance signal;

receiving said magnetic resonance signal; and

determining a phase of said magnetic resonance signal and, from said phase, determining said field strength of said antenna-emitted radio-frequency field.

Claim 2 has been amended as follows:

2. (Currently amended) A method as claimed in claim 1 comprising exciting said magnetic resonance signal in said subject in a spatially resolved manner within a measurement volume, and determining a spatially-dependent phase ~~position~~ of the magnetic resonance signal and determining said field strength as a function of a location within said measurement volume.

3. (Previously presented) A method as claimed in claim 1 comprising receiving said magnetic resonance signal in said subject in a spatially resolved manner within a measurement volume, and determining a spatially-dependent phase

position of the magnetic resonance signal and determining said field strength as a function of a location within said measurement volume.

4. (Previously presented) A method as claimed in claim 1 wherein said at least one radio-frequency pulse produces a flip angle of nuclear spins in said subject, and comprising determining said flip angle from said phase and determining said field strength dependent on said flip angle.

5. (Original) A method as claimed in claim 1 comprising receiving said magnetic resonance signal in a gradient echo technique.

6. (Original) A method as claimed in claim 1 comprising phase-modulating said at least one radio-frequency pulse.

7. (Original) A method as claimed in claim 6 comprising employing a phase-modulated rectangular pulse as said at least one radio-frequency pulse.

8. (Previously presented) A method as claimed in claim 1 comprising receiving said magnetic resonance signals in respectively separate measurements and, for each measurement, determining the phase of the magnetic resonance signal, and determining a phase difference between the respective ~~phase-positions~~ phases from two of said measurements and determining said field strength dependent on said phase difference.

9. (Original) A method as claimed in claim 8 comprising employing measurements, as said separate measurements, that are identical except for the at least one radio-frequency pulse.

10. (Original) A method as claimed in claim 9 comprising emitting said at least one radio-frequency pulse in one of said measurements that starts with a phase, and shifting said phase after a time by a value in a shifted direction, and

emitting said at least one radio-frequency pulse in another of said measurements that starts with said phase, and shifting said phase after said time by said value in a direction opposite to said shifted direction.

11. (Original) A method as claimed in claim 1 wherein the step of emitting at least one radio-frequency pulse comprises emitting at least one short, intensive radio-frequency pulse.

12. (Original) A method as claimed in claim 1 wherein said magnetic resonance examination apparatus has a basic magnetic field associated therewith, said basic magnetic field exhibiting spatially-dependent field inhomogeneities, and wherein the step of determining said field strength comprises determining a spatially-dependent field strength taking said spatially-dependent field inhomogeneities into account.

13. (Previously presented) A method as claimed in claim 1 wherein the step of determining said field strength comprises determining a spatially-dependent field strength for a group of adjacent voxels by identifying the phase of respective magnetic resonance signals for individual voxels in said group and combining the respective phases into a common phase, and determining the field strength for said voxel group from said common phase.

14. (Previously presented) A method as claimed in claim 13 wherein each of the magnetic resonance signals for the individual voxels has an amplitude, and comprising weighting the phase dependent on the amplitude of the associated magnetic resonance signal.

15. (Original) A method as claimed in claim 1 wherein the step of determining said field strength comprises determining a spatially-dependent field

strength for a group of adjacent voxels by identifying the phase difference of respective magnetic resonance signals for individual voxels in said group and combining the respective phase differences into a common phase difference, and determining the field strength for said voxel group from said common phase difference.

16. (Previously presented) A method as claimed in claim 15 wherein each of the magnetic resonance signals for the individual voxels has an amplitude, and comprising weighting the phase difference dependent on the amplitude of the associated magnetic resonance signal.

17. (Previously presented) A method as claimed in claim 1 comprising employing said field strength determined from said phase to optimize said field strength in a predetermined volume region of the subject.

Claim 18 has been amended as follows:

18. (Currently amended) A magnetic resonance examination apparatus comprising:

a magnetic resonance scanner adapted to receive a subject therein, said magnetic resonance scanner having a radio-frequency antenna;
a control computer for operating said magnetic resonance scanner, including operating said radio-frequency antenna; and
said control computer operating said magnetic resonance scanner and said radio-frequency antenna to ~~produce a radio-frequency field, having a field strength, by emitting~~ emit at least one radio-frequency pulse from said radio-frequency antenna to generate an antenna-emitted radio-frequency field having a field strength, and thereby exciting a magnetic

resonance signal from said subject, ~~for acquiring and to acquire~~ said magnetic resonance signal, ~~for~~ said control computer determining a phase of said magnetic resonance signal, and ~~for~~ determining said field strength of said antenna-emitted radio-frequency field from said phase.

Claim 19 has been amended as follows:

19. (Currently amended) A computer program product loadable into a control computer of magnetic resonance examination apparatus having a radio-frequency antenna operated by said control computer, said computer program product running in said control computer and causing said control computer to:

operate said antenna to ~~produce a radio-frequency field, having a field strength, by emitting~~ emit at least one radio-frequency pulse to generate an antenna-emitted radio-frequency field having a field strength, and thereby exciting a magnetic resonance signal in a subject in said field;

to acquire said magnetic resonance signal; and

to determine a phase ~~position~~ of said magnetic resonance signal and to determine said field strength of said antenna-emitted radio-frequency field from said phase ~~position~~.